AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 of 9

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0003	28 June 2000		

6. ISSUED BY CODE

CONTRACTING OFFICER
NAVAL RESEARCH LABORATORY
ATTN: CODE 3220.CB
WASHINGTON DC 20375-5326

7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, country, State and ZIP Code)*

TO ALL OFFERORS

CODE FACILITY CODE

(✓) X

9A. AMENDMENT OF SOLICITATION NO.
N00173-00-R-CB01

9B. DATED *(SEE ITEM 11)*
16 May 2000

10A. MODIFICATION OF CONTRACT/ORDER NO.

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [ ] is extended, [X] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning 2 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer x submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(✓) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103 (b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

SEE PAGE 2

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY *(Signature of Contracting Officer)*	16C.DATE SIGNED

The purpose of this amendment is to provide answers to questions from prospective offerors in regards to the Statement of Work (SOW) and the site visit. The SOW, Schedule of Supplies/Services and delivery requirements are also revised.

1. Following are questions and responses:

Question 1:

How thick is the concrete floor to which the scanner and any associated mounting platform will be bolted? What is the rated load bearing capacity of this floor per unit area?

Answer to Question 1:

The raised base is no longer considered – See Revised Attachment #2 Chamber Layout. The scanner will be placed on the existing floor that is 6 inches thick. The rated load capacity of this floor is 1000 lbs. / sq. foot.

Question 2:

What is the load capacity of the overhead crane in the chamber?

Answer to Question 2:

The load capacity of the overhead crane is 1100 lbs.

Question 3:

Verify clearance dimensions for chamber doors, and any other potential restrictions in the path for bringing subsections of the scanner into the chamber.

Answer to Question 3:

The clear door entrance is 80" across and 96" high. The outer door leads to a high bay area that has ample space to stage the scanner equipment.

Question 4:

Verify the highest frequency for which the scanner is intended to be used.

Answer to Question 4:

See revised Specifications, Attachment No. 1, in section 3.3.6 and section 5.10.

Question 5:

What RF hardware is to be used for the multibeam antenna measurements that are referred to in the RFP?

Answer to Question 5:

Current implementation would include using GP-IB signals to control a HP switch box driver or a custom beam controller.

Question 6:

Is the RF absorber referred to in paragraph 5.1 intended to be only enough absorber as required to cover the frame of the scanner, or is it intended that enough be provided to populate a false wall in front of the scanner when the compact range is being used?

Answer to Question 6:

The absorber is only intended to cover the scanner frame and any other structures on the scanner that may need covering to allow the scanner to meet the required specifications.

Question 7:

Verify distance from the tips of the backwall absorber to the edge of the floor slide.

Answer to Question 7:

The distance from the tip of the backwall absorber to the edge of the floor slide is 63".

Question 8:

What is the distance between the back edge of the AUT positioner and the back wall of the chamber? What is the thickness of the absorber on the back wall?

Answer to Question 8:

The distance between the back edge of the AUT positioner and the back wall of the chamber is 87". The absorber is 24" thick.

Question 9:

What is the desired height of the scan plane center?

Answer to Question 9:

105 - 110 ". See revised Specification, Attachment No. 1, in section 3.3.7.

Question 10:

What is the height of the center of the upper roll axis of the AUT positioner?

Answer to Question 10:

See revised Specification, Attachment No. 1, in section 3.3.7.

Question 11:

What is available in addition to the overhead crane to move the scanner into the room?

Answer to Question 11:

NRL has a Rigging crew that will handle any moving of objects into the chamber.

Question 12:

What is the capacity of the overhead crane?

Answer to Question 12:

The capacity of the overhead crane is 1100 lbs.

Question 13:

Section 3.3.3 Pol-axis. Does NRL want continuous rotation on the roll axis?

Answer to Question 13:

No. NRL does not want continuous rotation on the roll axis.

Question 14:

3.2.10 Main Drive System. Will NRL accept drive systems other than stepper motors which are compliant with the remainder of the specifications?

Answer to Question 14:

See revised Specification, Attachment No. 1, in section 3.2.10.

Question 15:

3.2.14 RF Cables: Are these RF cables in addition to the flexible cable used in the cable track of the planner scanner, or are these intended for the cable track?

Answer to Question 15:

These are only to be used in the cable track of the scanner.

Question 16:

4.1.11.4 You have specified that the software is capable of being upgraded to a Nearfield Systems Inc. trademarked software product. Is NRL requiring other bidders to provide an upgrade path requiring the use of a competitor's proprietary software? If not what are the requirements for this upgrade path?

Answer to Question 16:

See revised Specifications, Attachment No. 1, in section 4.1.11 and 5.10. Since NRL foresees the need to measure antennas up to 110 GHz, it is necessary to provide capabilities in the system that will allow NRL to utilize existing hardware up to these frequencies.

Question 17:

What are the minimum dimensions of the space (L x W x H) that the scanner is intended to fit within?

Answer to Question 17:

The maximum dimensions are 265 " x 63" x 288". The minimum dimensions are 260" x 24" x 190"

Question 18:

The offeror's proposed system for a scan area coverage of 22' x 12' will require a footprint of 354" x 50". It appears the offeror's proposed scanner will fit within the room shown in the SOW if the scanner is oriented along the long wall. Is this acceptable?

Answer to Question 18:

No. This is not acceptable.

Question 19:

If the offeror cannot provide the required scan area within the space allocated, will the proposal be considered non-complaint and rejected?

Answer to Question 19:

No. The 22' dimension is not a scan dimension but a physical dimension. The 12' is a scan dimension.

Question 20:

What alternative orientations of the scanner will be considered (if any) within the room space?

Answer to Question 20:

The scanner must fit on the back wall given the dimensions above (L x W x H) (265" x 63" x 288").

Question 21:

Can the existing positioner in the center of the room be relocated?

Answer to Question 21:

No. The existing positioner in the center of the room can not be relocated.

Question 22:

Scanner size option (Specification) - In section 2.0 Scope- the requirement is to provide an upgrade path to increase the scanner size from 22' horizontal x 12' vertical scan plane to a 23' x 22 ' plane. The offeror assumes the 23' refers to the vertical dimension. Is this correct?

Answer to Question 22:

The 23' refers to the horizontal (scan) dimension and 22' refers to the vertical (scan) dimension.

Question 23:

Room size - The chamber layout drawing shows room dimensions of 43.0' x 24.0'. Is this the clear space (from absorber tip to absorber tip) that is available to accommodate the scanner? If not, what is the clear space including room height.

Answer to Question 23:

The clear space in the chamber where the scanner will be placed is (L x W x H) 265" x 63" x 288".

Question 24:

Operating Temperature (Specification) – Section 3.2.3 specifies the operating environment as 0 to 50 degrees C. Section 3.3.5 specifies the operating environment of 70 degrees F +/- 4 degrees. Please Clarify.

Answer to Question 24:

See revised specifications in section 3.2.3.

Question 25:

Spherical and Cylindrical Scanning Requirement (Specification) – Section 2.0 requires the system to interface to an SA4139 positioner controller to allow for both cylindrical and spherical scanning. Can the SA 4139 and other supporting equipment be shipped to offeror for System integration and testing?

Answer to Question 25:

No. The equipment can not be shipped to offeror for integration and testing.

Question 26:

Receiver Support (Specification) – Section 2.0 states that the system must support the HP8530 Microwave receiver or the SA1785 receiver. Section 3.2.6 states the system must support HP and SA receivers. Please clarify.

Answer to Question 26:

See revised specifications, Attachment No. 1, in section 2.0 and 3.2.6. NRL is not asking to support the SA 1785 receiver.

Question 27:

Proprietary Data Format (Specification) – Section 4.1.8.3.2 requires support of a "proprietary" format. What is meant by this statement? What is the proprietary format that must be supported? Is this an NRL format?

Answer to Question 27:

Proprietary format is referred to as the contractor's individual format, to be a part of the contractor's proposal to the government.

2. The Schedule of Supplies/Services and Required Delivery is revised to add Option 10:

Item No.	Schedule of Supplies/Services	Quantity	Unit	Unit Price	Amount
Option 10					
0013	Millimeter Wave Upgrade, Specification/SOW, Attachment No. 1	1	EA	$	$

The required delivery is revised to add CLIN 0013.

ITEM NO.	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT AWARD
0013	1	210 Days after exercise of option

3. The Specification/SOW, Attachment No. 1, and the Chamber Layout, Attachment No. 2, provided with the original solicitation is deleted and replaced with the revised attachments.

Specification/SOW
Near Field Planar Scanner
Measurement System

1.0 Background

The Near Field Planar Scanner Measurement System will be used to make antenna pattern measurements on various antenna systems by using the concept that an aperture field close to the antenna contains all the information required to determine the far-field pattern of the antenna under test (AUT). Unlike a conventional antenna range which requires that the antenna be located some distance away from a transmitter site, in a near field scanner system a small probe is placed close to the antenna under test. The probe will be moved across the entire aperture of the antenna while both the phase and amplitude of the received signal is recorded. After the data has been collected, various mathematical transforms will be performed on the data to produce the far field response of the AUT. The main use of this scanner will be to measure large phased array antenna system and subsystems.

The Near Field Scanner will be installed in a existing Compact Range Facility. The Scanner System must be compatible with existing RF hardware and postioners that are installed in the Compact Facility.

2.0 Scope

The contractor shall provide a Planar Near Field Antenna Measurement System that is capable of scanning in a 12-foot vertical plane with a horizontal scanning plane that is 22' based on the physical dimensions of the existing chamber (absorber tip to absorber tip). The system must be able to utilize the existing HP 8530 Microwave receiver using a dual source configuration and interface to an 8-axis SA 4139-positoner controller to allow both cylindrical and spherical near field scanning capabilities. The physical hardware, which will be installed in the chamber must be upgradeable to provide for a larger scanning area (up to a 23 x 22) for possible future measurement requirements. The basic system must provide for this upgrade path.

3.0 Near Field Measurement System

3.1 The contractor shall provide a Planar Near Field Scanner System and Software package that meet or exceed the following specifications.

3.2 Hardware System Requirements

3.2.1	Usable Scanner Area:	12'(vertical) x 22' (horizontal)
3.2.2	Scanner Configuration:	X-Y and rotational Travel
3.2.3	Operating Environment:	**70 degree F +/- 4 degrees F** **Humidity 45% +/- 15%**
3.2.4	Portability:	Must be able to relocate

3.2.5 Safety Features: Incorporate failsafe Safety System, motor brakes and Switches
3.2.6 RF System: Must support HP 8530 Dual Source System
3.2.7 Positioning Equipment: Must support SA Positioners
3.2.8 Computer System: IBM Compatible
3.2.9 Probes: X-Band
3.2.10 Main Drive System: Stepper or Servo Motors
3.2.11 Leveling casters for portability
3.2.12 Controller electronics and motor cables
3.2.13 X-band waveguide probe with a waveguide to coax adapter
Frequency Range 8.2 – 12.4 GHz (WR90)
3.2.14 Two 50 foot RF cables (18 GHz)

3.3 System Performance Specifications

3.3.1 X-Axis		
3.3.1.1	**Length:**	**265"**
3.3.1.2	Speed:	10 ips
3.3.1.3	Accuracy:	+/- 0.001"
3.3.1.4	Resolution:	0.002"
3.3.2 Y-Axis		
3.3.2.1	Travel:	12 feet
3.3.2.2	Speed:	10 ips
3.3.2.3	Accuracy:	+/- 0.001"
3.3.2.4	Resolution:	0.002"
3.3.3 Pol-Axis		
3.3.3.1	Travel:	360 degrees
3.3.3.2	Speed:	8 degrees / sec
3.3.3.3	Accuracy:	+/- 0.05 degrees
3.3.3.4	Resolution:	0.01 degrees

3.3.4 Probe Weight Requirements
The scanner must be able to support probes down to a WR 975 (.75 – 1.12 GHz) with a suitable counter balance.

3.3.5 Operating Environment
The system will be installed in a pre-existing chamber facility with both temperature (70 deg F +/- 4 deg F) and humidity control (45% +/- 15%).

3.3.6 Frequency Range
3.3.5.1.1 Standard Range: 1- 50 GHz
3.3.5.1.2 Optional: 50-110 GHz

3.3.7 Center of Vertical Scan Plan
The center of the vertical scan plane must be located between 105-110" off the floor surface.

4.0 Software Package

4.1.1 The computer system must be a minimum of a 800 MHz Pentium III (or equivalent) operating under Windows 98 and includes the following items:
- 4.1.1.1 Read / Write CD unit
- 4.1.1.2 Two Removable Hard Drives
- 4.1.1.3 2 GB Jaz Drive
- 4.1.1.4 256 MB Memory (minimum)
- 4.1.1.5 21 inch Monitor
- 4.1.1.6 Graphics Card (minimum of 2 MB on card memory)
- 4.1.1.7 Network Card (10-based T)

4.1.2 Operate on windows NT or 98 operating system

4.1.3 Provide full 32-bit muti-tasking

4.1.4 Provide both Near Field and Far Field Measurement systems

4.1.5 Provide the following Measurement capabilities
- 4.1.5.1 Planar near-field
- 4.1.5.2 Cylindrical near-field
- 4.1.5.3 Spherical near-field
- 4.1.5.4 Far-Field
- 4.1.5.5 Multibeam, Multifrequency measurements
- 4.1.5.6 Acquire and process data simultaneous

4.1.6 Provide the following Processing capabilities
- 4.1.6.1 Near-field transforms
  - 4.1.6.1.1 Planar
  - 4.1.6.1.2 Cylindrical
  - 4.1.6.1.3 Spherical
- 4.1.6.2 Coordinate Systems
  - 4.1.6.2.1 K-Space
  - 4.1.6.2.2 Az-over-El
  - 4.1.6.2.3 El-over-Az
  - 4.1.6.2.4 Theta-phi
- 4.1.6.3 Linear and Circular polarization
  - 4.1.6.3.1 Ludwig-3 (Eh,Ev)
  - 4.1.6.3.2 Ludwig-2 (Eaz/Eel)
  - 4.1.6.3.3 Ludwig-2 (Eel/Eaz)
  - 4.1.6.3.4 Ludwig-2(Eq/Ef)
- 4.1.6.4 Holographic Back Projection
- 4.1.6.5 Gain and Directivity

4.1.7 Probe Correction
- 4.1.7.1 Models
  - 4.1.7.1.1 Open-ended waveguide
  - 4.1.7.1.2 Cosine
  - 4.1.7.1.3 None
- 4.1.7.2 Aperture Truncation and Tapering
- 4.1.7.3 Probe Position compensation and K-Correction

4.1.8 Plotting Capabilities
- 4.1.8.1 Antenna Patterns
  - 4.1.8.1.1 Amplitude
  - 4.1.8.1.2 Phase

4.1.8.1.3 Principal polarization
4.1.8.1.4 Cross polarization
4.1.8.2 Plot types
4.1.8.2.1 Linear
4.1.8.2.2 Polar
4.1.8.2.3 Gray-scale
4.1.8.2.4 Contour
4.1.8.2.5 3D plots
4.1.8.2.6 Listing
4.1.8.3 File Format
4.1.8.3.1 ASCII
4.1.8.3.2 Proprietary
4.1.8.4 Misc.
4.1.8.4.1 Multiple on screen plots
4.1.8.4.2 Multiple plot overlays

4.1.9 The software must be able to allow for multi-tasking. This includes working with word processors or process data while acquiring new data.

4.1.10 The software must include all documentation and be a supported software package.

4.1.11 The software package must be upgradeable to allow for the following functionality.
4.1.11.1 Probe pattern file correction
4.1.11.2 Arbitrary surface hologram
4.1.11.3 Scripting Capabilities

5.0 Options

5.1 Option 1 RF Absorber

The RF absorber provided by the contractor must have a minimum attenuation of 30 dB @ 1 GHz for a quantity of one.

5.2 Option 2 Probe A

Probe A provided by the contractor must have a frequency range of .75 – 1.12 GHz utilizing a WR-975 open ended waveguide for a quantity of one.

5.3 Option 3 Probe B

Probe B provided by the contractor must have a frequency range of 1.12 – 1.7 GHz utilizing a WR-650 open ended waveguide for a quantity of one.

5.4 Option 4 Probe C

Probe C provided by the contractor must have a frequency range of 1.7 – 2.6 GHz utilizing a WR-430 open ended waveguide for a quantity of one.

5.5 Option 5 Probe D

Probe D provided by the contractor must have a frequency range of 2.6 – 3.95 GHz utilizing a WR-284 open ended waveguide for a quantity of one.

5.6 Option 6 Probe E

Probe E provided by the contractor must have a frequency range of 3.95 – 5.85 GHz utilizing a WR-187 open ended waveguide for a quantity of one.

5.7 Option 7 Probe F

Probe F provided by the contractor must have a frequency range of 5.85 – 8.2 GHz utilizing a WR-137 open ended waveguide for a quantity of one.

5.8 Option 8 Probe G

Probe G provided by the contractor must have a frequency range of 12.4 – 18.0 GHz utilizing a WR-62 open ended waveguide for a quantity of one.

5.9 Option 9 Probe Travel: z-axis travel

The Probe provided by the contractor must have the following specifications (for a quantity of one)

Travel:	3 inches
Speed:	3 ips
Accuracy:	+/- 0.001"
Resolution:	0.00205
Planarity(rms.):	0.004

Note: All probes, Options 2 through 8, must have a waveguide to SMA female coax adapter included.

5.10 **Option 10 Millimeter Wave Upgrade**

In order to perform measurements above 50 GHz, the contractor shall provide techniques (both software and/or hardware) that will enable the existing scanner equipment to perform measurements at millimeter frequencies (> 50 GHz). The contractor shall also describe the complexity required for each upgrade and overall projected performance improvement.

6.0 Installation and Integrating

The Contractor is responsible for installing and integrating a fully functional system at NRL no later than 14 days after delivery of the system, 210 days, to the laboratory.

7.0 Technical Support

The contractor shall provide telephone/fax technical support for a period starting with delivery of the completed system and extending for 12 months after the installation and training is completed.

8.0 Training

The contractor shall provide training for the Near Field Scanner Measurement System. The training will take place at NRL for four personnel for a period of eight (8) hours. The operators' manuals shall be used in the training session.

9.0 Acceptance Test Procedures

The contractor must submit 30 days after contract award, for government approval, a system performance verification procedure for the overall system and subsystems, which will be used to verify system performance specifications.

10.0 Manufacturers Data and Specs

The manufactures published specifications, for all subsystems to be delivered under the contract, must be submitted 30 days after contract award for Government review.

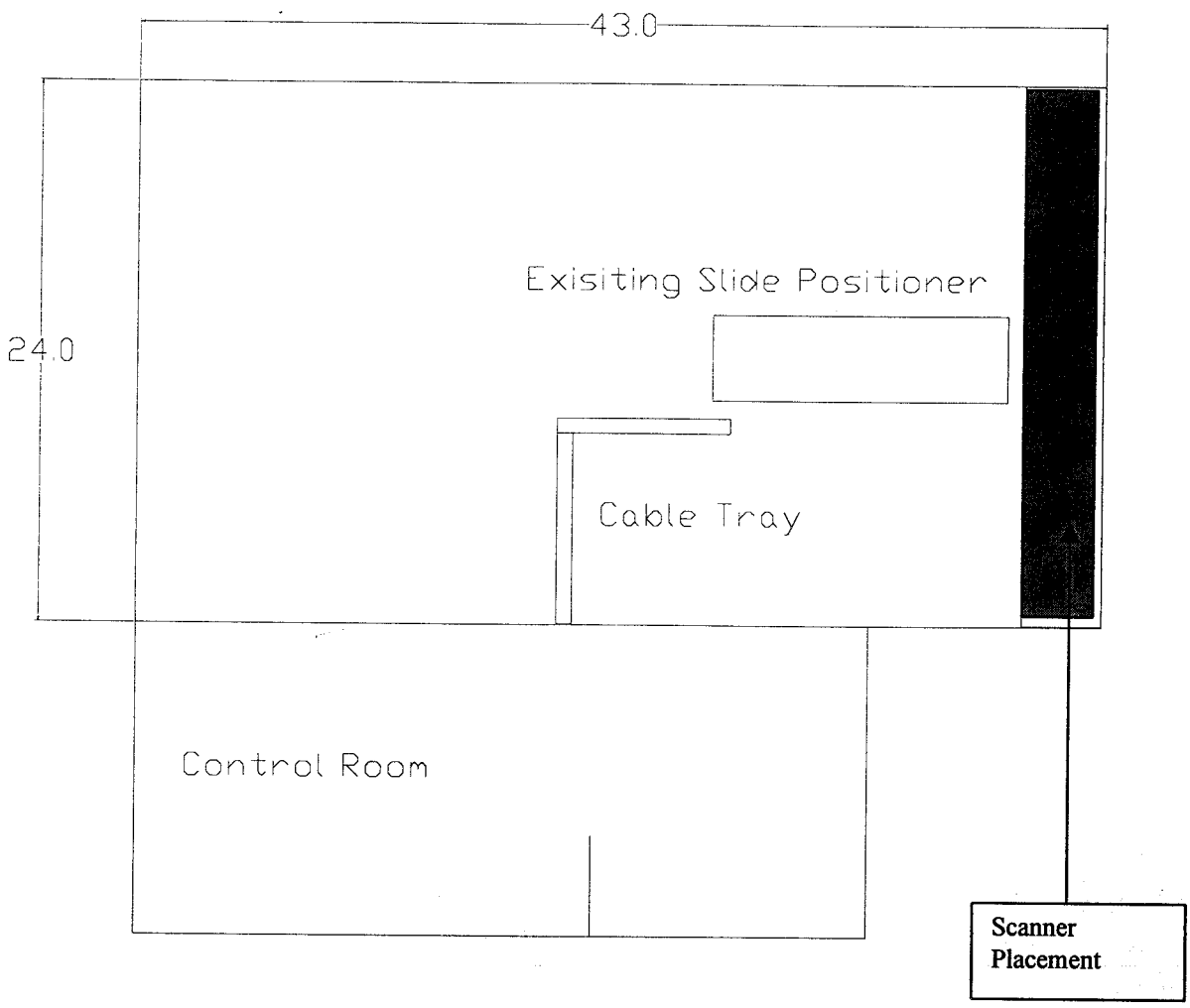
11.0 System Verification and Acceptance

The contractor shall provide test data, based on Section 9 procedures, verifying that all system performance parameters are met for the Near Field Scanner System. **Acceptance is complete following a system demonstration at the Naval Research Laboratory that includes measurement of a Government furnished antenna.** The antenna for this demonstration shall be provided by NRL.

12.0 Warranties

The contractor must provide a standard commercial warranty for the Near Field Planar Scanner Measurement System.

CHAMBER LAYOUT



Attachment 1

The Scanner will be placed on the existing floor surface.